

Device Consolidation Benefits WAN Infrastructure



Worry-Proof Internet

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Small and medium-sized enterprises (SMEs) often find the provisioning of WAN infrastructure to be a daunting task. Many issues come up related to complexity and cost, however, these issues can be solved through device consolidation. While WAN infrastructure complexities and the associated costs can affect any IT organization, SMEs are especially sensitive to these issues, as their budgets and resources are considerably smaller than larger enterprise organizations.

Unequaled performance

As with most things in life, the rule of lowest common denominator applies to the purchase of network devices and their relative performance. For example, if you purchase a firewall that is capable of handling 50 Mbps of throughput, and a WAN link load balancer capable of handling 1 Gbps of throughput, you essentially paid 950 Mbps too much for your WAN link load balancer. Add in several additional devices, such as a traffic shaper, VPN, and any other devices you need, and whatever device handles the least amount of throughput will be the element that restricts overall performance. Therefore, for every one of the devices that have throughput levels higher than that of the least capable device, the higher throughput cannot be utilized. So, if you paid a higher price for a device with greater throughput, you paid for capacity that can't be leveraged.

In a perfect world, the device capacity should match each other fairly closely. Unfortunately, that rarely occurs, even when the products are from the same vendor. In a less than perfect world, companies need to find solutions that balance device performance, capabilities, interoperability and price.

The issue of complexity

Larger enterprises may benefit from an IT department with great technical expertise and a team of talented engineers, while SMEs IT staffing is more limited. With that said, simplicity is always an advantage for any network deployment, but it is a key factor for the SME with limited IT resources.

Complexity within the WAN infrastructure can directly affect the performance of the network, its ability to react and adjust to adverse performance changes and can even cause a network to go down. Most WAN infrastructure devices are located in-line with the traffic flow. Stringing together an ISP aggregator, intelligent link load balancer, firewall, and traffic shaper together within a redundant WAN infrastructure can create a quagmire of redundant cross-connections.

Not only do the devices need to be chained so they are within the traffic flow, but it must be done in such a way that if any of the elements were to fail, the traffic would be diverted to the secondary device, without disrupting upstream or downstream flows. While this can be accomplished in a number of ways through dual-homing interfaces, NIC teaming, NAT, floating IP address schemes, etc., it can be complicated and difficult to troubleshoot.

Adding up the cost – it's time to sharpen your pencil

When adding up the cost of multiple, diverse types of equipment, organizations often discover that the costs for multiple devices do not match the size of their budgets. Due to cost issues, an organization may need to choose between an inexpensive device with very limited functionality and an expensive device with a high degree of functionality. As an example, an organization might purchase a simple dual WAN router for several hundred dollars. A dual WAN router uses simple policy to "route outbound-only traffic" over one of two lines. There is no intelligence in the technique and no method to avoid or minimize congestion. A dual WAN router does nothing in terms of load balancing and failover for inbound traffic.

As mentioned earlier, while a dual WAN router will provide link failover across two ISP links, it will not help inbound traffic. So, if a link goes down, all users within the LAN will be unable to connect to the WAN.

WAN Optimization Services specializing in WAN link aggregation can automate both inbound and outbound

link load balancing and failover, and some services can also provide for site failover and fallback. As with most technology, larger enterprises have enjoyed the benefits of this technology first. However, these services are now affordable and available to the SME market.

Another example is the use of multi-homed networks, which are becoming increasingly popular by providing networks with greater reliability and higher performance. ISPs and large enterprises have multi-homed for years using BGP to connect to multiple Internet backbones. But BGP has many restrictions. For one, it requires that ISPs cooperate with each other and set up "peering" agreements between routers, but because of the performance impact to their networks, many are not willing to do so. BGP requires expensive routers, designated address blocks and an Address Space Number (ASN), which are sometimes not available to small businesses. BGP also requires that gateway hosts exchange dynamic routing tables, which must be constantly synchronized and which can lead to delays of up to 30 minutes in changing the traffic direction.

A WAN Optimization Service specializing in WAN link aggregation accomplishes multi-homing by using Network Address Translation (NAT) on a micro-appliance to unify traffic coming from and going to different destination IP addresses on the Internet. They are configured with at least one routable IP address for each router/WAN link that it is connected to the network.

The biggest benefit such micro-appliances offer for multi-homing resides in their ability to achieve outgoing and incoming load balancing and failover without defining BGP routing tables, or utilizing any of the underlying complicated routing techniques. The ability to offer this functionality without the expensive and complicated networks/equipment necessary to achieve BGP is what makes them an exceptional value, especially for small and medium sized enterprises.

Device consolidation supported by WAN Optimization Services are a benefit to the SME

Device consolidation is one solution to the problem of WAN infrastructure over-provisioning and complexity. By combining the functionality of several stand-alone, single capability devices into one multi-function micro-appliance supported by services, an SME's IT department can address multiple issues related to network complexity, over-provisioning, and cost. Device consolidation is not a new idea. It has been implemented within many areas of IT, but for the SME, WAN infrastructure device consolidation is particularly beneficial.

A good example of this is the bringing together of a network firewall and WAN link load balancer. Until recently, firewalls and WAN link load balancers were separate devices, yet they were increasingly being deployed next to each other. They both provided necessary services to a WAN infrastructure, with the WAN link load balancer providing link load balancing and failover for reliability and performance - directing traffic among multiple and diverse WAN and ISP links, and the firewall providing the network security - protecting the data and applications going over the WAN.

Today, WAN Optimization Service providers are beginning to bundle firewall capabilities into their services. This significantly eases the deployment of both WAN link load balancer and the firewall, as there is only one redundant micro-appliance to configure, and managing and securing WAN traffic is much easier through a single appliance. This device combination dramatically reduces equipment, management and ongoing support costs.

Device consolidation continues to expand as technology integration becomes more efficient, and solutions become commoditized. VPN devices, which once enjoyed a rapid popularity within the headquarters, are rapidly becoming commoditized and bundled within other network devices. While they are useful as stand-alone solutions, the benefits don't always make up for the cost and complexity of their deployment.

Today, the industry is seeing a continued interest in VPN security, but, not necessarily as stand-alone devices. For example, VPN security is being bundled within WAN Optimization Services. By adding VPN security into a WAN Optimization Service, the cost associated with VPN security is significantly reduced, while added value is brought to the service.

WAN Optimization Services also help to consolidate multiple, diverse WAN and ISP links. For example, an organization may have two 768 Kbps DSL links that can be combined for a total aggregated bandwidth equivalent to a T1 - at a fraction of the cost. You can add additional lower speed links such as xDSL, cable, wireless, and others, with a relatively small increase in cost that can more closely match your needs. In addition to receiving more cost-effective bandwidth, you are dramatically increasing the reliability of your WAN network due to the new levels of

redundancy through the aggregation of multiple Internet links.

WAN link load balancing and failover, traffic shaping and application prioritization, firewall, VPN security and other functionalities are becoming integrated within a single micro-appliance supported by WAN Optimization Services. By having a single device, many of the equipment issues that SMEs deal with are solved. From a complexity standpoint, it is easier to manage traffic flows and redundancy with a single redundant pair of devices, than several pairs of disparate equipment.

Summary

Small and medium-sized enterprises (SMEs) are looking for ways to improve the reliability and performance of their WAN infrastructure. Network device consolidation offers cost savings and eases the complexity of managing, maintaining and supporting multiple devices. There are many difficult issues related to WAN infrastructure complexity, cost, and performance. However, many of these issues can be resolved through device consolidation. Specialized WAN Optimization Services can be an affordable solution for SMEs looking to make their WAN connectivity more reliable and better performing, while simplifying and consolidating their WAN infrastructure.